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09/485,377

(FILE 'HOME' ENTERED AT 11:10:59 ON 26 SEP 2000)

FILE 'AGRICOLA, CAPLUS' ENTERED AT 11:11:06 ON 26 SEP 2000

L1 97048 S STARCH
L2 286556 S HYDROLYSIS
L3 134201 S HYDROLYZ?
L4 189051 S DEGRAD?
L5 5256 S DEPOLYMERIZ?
L6 551001 S L2 OR L3 OR L4 OR L5
L7 12645 S L1 (P) L6
L8 273862 S CONTINUOUS
L9 314 S L7 (P) L8
L10 304 DUP REM L9 (10 DUPLICATES REMOVED)
L11 46712 S TUBULAR
L12 10 S L10 AND L11
L13 343805 S CONTINUOUS?
L14 343805 S L13 OR L8
L15 388 S L7 (P) L14
L16 11 S L15 AND L11
L17 11 DUP REM L16 (0 DUPLICATES REMOVED)
L18 1 S L17 NOT L12
L19 97048 S STARCH OR STARCHES

FILE 'CAPLUS' ENTERED AT 11:25:04 ON 26 SEP 2000

L20 84157 S L1
L21 518196 S L2 OR L3 OR L4 OR L5
L22 11534 S L20 (P) L21
L23 262636 S L8
L24 289 S L22 (P) L23
L25 263920 S APPARATUS
L26 22 S L24 AND L25
L27 11 S L17
L28 18 S L26 NOT L17

09/485,377

L12 ANSWER 1 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1995:435679 CAPLUS
DOCUMENT NUMBER: 122:190792
TITLE: Hydrolysis of material containing cellulose and/or starch
INVENTOR(S): Nilsson, Kjell
PATENT ASSIGNEE(S): Regalco AB, Swed.
SOURCE: PCT Int. Appl., 17 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9424316	A1	19941027	WO 1994-SE336	19940415
W: AU, BB, BG, BR, BY, CA, CN, CZ, FI, HU, JP, KP, KR, KZ, LK, LV, MG, MN, MW, NO, NZ, PL, RO, RU, SD, SK, UA, US, UZ, VN				
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
SE 9301263	A	19941017	SE 1993-1263	19930416
SE 501141	C2	19941121		
AU 9465474	A1	19941108	AU 1994-65474	19940415
EP 795034	A1	19970917	EP 1994-913239	19940415
R: DE, DK, FR, GB				
FI 9504878	A	19951115	FI 1995-4878	19951013
PRIORITY APPLN. INFO.:			SE 1993-1263	19930416
			WO 1994-SE336	19940415

AB Chem. reactions and **continuous hydrolysis** of materials rich in cellulose, e.g., wood, and(or) **starch** are achieved in a **tubular** reactor by introducing the material at a temp. and pressure adapted for **hydrolysis**, into a limited zone with intensive mixing to start the **hydrolysis**, which is later stopped in a limited zone at the discharge end by means of an intensive mixing with chems. to neutralize the material. Thus, wood chips were **hydrolyzed** by the above method and app. to give furfural, glucose, and lignin.

L12 ANSWER 2 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1991:585691 CAPLUS
DOCUMENT NUMBER: 115:185691
TITLE: **Tubular** apparatus for continuously processing starch products
INVENTOR(S): Jaroslawski, Leszek; Kosicki, Zenon; Remiszewski, Marian; Zielonka, Roman
PATENT ASSIGNEE(S): Centralne Laboratorium Przemyslu Ziemniaczanego, Pol.
SOURCE: Pol., 4 pp.
CODEN: POXXA7
DOCUMENT TYPE: Patent
LANGUAGE: Polish
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

PL 150588 B1 19900630 PL 1986-263097 19861217
 AB The viscosity of starch product, e.g., hydrolyzate solns., is reduced by passing the solns. through a system of 4 or 6 connected pipes of various diams. and lengths with shear mixing. Thus, an aq. hydrolyzed starch soln. was passed through a series of 6 interconnected pipes having diams. 10, 50, 70, 100, 200, and 100 mm, resp., and length 300, 7000, 10,000, 80,000, 1500, and 2000 mm, resp., with shear mixing to reduce the viscosity from 500 to 1.5-3 mPa-s.

L12 ANSWER 3 OF 10 CAPLUS COPYRIGHT 2000 ACS
 ACCESSION NUMBER: 1986:226604 CAPLUS
 DOCUMENT NUMBER: 104:226604
 TITLE: Hydrolysis of lignocellulosic material
 INVENTOR(S): Just, Jack Tama Haigh
 PATENT ASSIGNEE(S): Ramsey, Francis John, N. Z.
 SOURCE: Eur. Pat. Appl., 23 pp.
 CODEN: EPXXDW
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 178777	A2	19860423	EP 1985-306420	19850910
EP 178777	A3	19861029		
EP 178777	B1	19910828		
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
CA 1266264	A1	19900227	CA 1985-490201	19850906
AU 8547190	A1	19860320	AU 1985-47190	19850909
AU 596077	B2	19900426		
AT 66696	E	19910915	AT 1985-306420	19850910
US 4908067	A	19900313	US 1988-147118	19880121
PRIORITY APPLN. INFO.:			NZ 1984-209527	19840913
			EP 1985-306420	19850910
			US 1985-774561	19850910
			US 1987-54031	19870521

AB A **continuous** countercurrent process was described to **hydrolyze** wood chips, cellulose, and **starch** with H₂O in the presence of weak acid using **tubular** reactor at 155-220.degree..

L12 ANSWER 4 OF 10 CAPLUS COPYRIGHT 2000 ACS
 ACCESSION NUMBER: 1986:185027 CAPLUS
 DOCUMENT NUMBER: 104:185027
 TITLE: Effect of technological parameters on the course of acidic hydrolysis of starch
 AUTHOR(S): Kosicki, Zenon; Jaroslowski, Leszek; Zielonka, Roman
 CORPORATE SOURCE: Cent. Lab. Potato Ind., Poznan, Pol.
 SOURCE: Acta Aliment. Pol. (1985), 11(1), 89-95
 CODEN: AAPODK
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB A suitable choice of reaction conditions allows constantly efficient prodn. of **hydrolyzates** (syrops) with dextrose equiv. (DE) values of 30-85 on an app. for **continuous hydrolysis** of **starch** with const. reactor capacity; no construction changes are

needed and only automatic control of temp. and **starch** [9005-25-8] suspension acidity are required. Taking into account syrup quality and Poland's capabilities as regards materials for building the **tubular** reactor, the following parameters of **hydrolysis** were detd.: (a) for syrups of 30-45 DE, 4.5-5.5 min, 140-144.degree., pH 1.7; (b) for syrup of 80 DE, 10 min, 150.degree., pH 1.7. In the entire range of saccharification of **starch** (38% dry substance) there was no reversion process. In comparison to **hydrolysis** performed with the same concns. in a batch converter of the autoclave type, there was considerable improvement in syrup quality esp. for those with DE values >60. The rate of **starch hydrolysis** may be changed by modifying either the temp. or the acid concn.

L12 ANSWER 5 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1984:512728 CAPLUS
DOCUMENT NUMBER: 101:112728
TITLE: Continuous process and apparatus for modifying carbohydrate material
INVENTOR(S): Assarsson, Per G.; Nagasuye, Joseph H.
PATENT ASSIGNEE(S): St. Lawrence Technologies Ltd., Can.
SOURCE: Can., 32 pp.
CODEN: CAXXA4
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CA 1159382	A1	19831227	CA 1980-358760	19800821
PRIORITY APPLN. INFO.:			US 1979-70438	19790828
			US 1980-167543	19800710

AB A **tubular** reactor having orifices was described to produce syrup with dextrose equiv (DE) .gtoreq.73 by saccharifying starch (I) with HCl at 130-170.degree.. Thus, 36.4% I slurry contg. 200 mL HCl/100 lb I was forced at 900 psi into a reactor with 140 s residence time at 166.degree. to give a syrup with 75 DE.

L12 ANSWER 6 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1984:155221 CAPLUS
DOCUMENT NUMBER: 100:155221
TITLE: Ethanol production
INVENTOR(S): Assarsson, Per Gunnar; Nagasuye, Joseph Hideo
PATENT ASSIGNEE(S): St. Lawrence Technologies Ltd., UK
SOURCE: Eur. Pat. Appl., 20 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 101190	A2	19840222	EP 1983-304109	19830715
EP 101190	A3	19860716		
R: BE, DE, FR, GB, IT, NL, SE				
US 4497896	A	19850205	US 1982-399228	19820719

CA 1190493	A1	19850716	CA 1983-431377	19830628
AU 8316485	A1	19840126	AU 1983-16485	19830701
AU 558403	B2	19870129		
ZA 8304962	A	19840425	ZA 1983-4962	19830707
NO 8302541	A	19840120	NO 1983-2541	19830713
NO 158752	B	19880718		
NO 158752	C	19881026		
FI 8302607	A	19840120	FI 1983-2607	19830718
BR 8303848	A	19840221	BR 1983-3848	19830718
ES 524203	A1	19841116	ES 1983-524203	19830718
JP 59042892	A2	19840309	JP 1983-132658	19830719
US 4578353	A	19860325	US 1985-697395	19850130
			US 1982-399228	19820719

PRIORITY APPLN. INFO.:

AB An app. for the **continuous** prodn. of EtOH [64-17-5] from **starch** [9005-25-8] is described. A slurry of **starch** and acid is moved through a high intensity **tubular hydrolyzer** to produce a **hydrolyzate** contg. glucose, which is neutralized and fermented. A slurry of 20% **starch** solids contg. 950 mL 31% HCl/100 lb. **starch** solids was passed through the reactor at 160-5.degree. and 30-5 atm. at a rate of 7.2 L/s. The **hydrolyzate** contained 86% glucose. It was neutralized and fermented with bakers' yeast to a product contg. 38% EtOH, which was removed by distn. The stillage was partially fed back to the slurry tank.

L12 ANSWER 7 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1982:120910 CAPLUS
 DOCUMENT NUMBER: 96:120910
 TITLE: Continuous or batch cooking of ground or crushed cereals or slurries
 INVENTOR(S): MacOwan, James Ronald
 PATENT ASSIGNEE(S): Grant, William, and Sons Ltd., UK; Sampson, Derick, and Partners
 SOURCE: PCT Int. Appl., 14 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 8103662	A1	19811224	WO 1981-GB99	19810611
W: BR, JP, US				
RW: AT, CH, DE, FR, GB, LU, NL, SE				
EP 54556	A1	19820630	EP 1981-901522	19810611
R: AT, CH, DE, FR, GB, LU, NL, SE				

PRIORITY APPLN. INFO.: GB 1980-19097 19800611

AB A process consisting mainly of treatment of maize slurry with steam at 9-13 atm in a **tubular** cooker, cooling to 100.degree., and recycling the flash steam originating from the cooling system to heat the incoming slurry in stages. Enzymic **hydrolysis** of the liquefied **starch** [9005-25-8] was described for **continuous** and batch fermn. for use in making natural spirits. The use of flash steam resulted in an overall energy savings of 64%.

L12 ANSWER 8 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1981:621675 CAPLUS
 DOCUMENT NUMBER: 95:221675
 TITLE: **Continuous production of starch hydrolyzates**
 INVENTOR(S): Hughes, John F.
 PATENT ASSIGNEE(S): Cellcor Corp. Canada Ltd., Can.
 SOURCE: Can., 18 pp.
 CODEN: CAXXA4
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CA 1107727	A1	19810825	CA 1978-294943	19780113

AB A **tubular** reactor was disclosed for the **continuous hydrolysis of starch** (I) [9005-25-8] in aq. slurry in the presence of HCl under inlet pressure .gtoreq.35 kg/cm2 at >125.degree.. Thus, introducing a mixt. of 45 kg corn I and 47.6 kg H2O in 240 mL 37% HCl at .apprx.5.6 L/min and 190.degree. under inlet pressure
 35 kg/cm2 into a reactor coil with total length 36.9 m having orifices (length-diam. ratio .apprx.4:1) gave syrup with 53.7 dextrose equiv.

L12 ANSWER 9 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1979:68517 CAPLUS
 DOCUMENT NUMBER: 90:68517
 TITLE: **Tubular** enzyme reactor using glucoamylase adsorbed onto an anionic resin. Application to maltodextrin hydrolysis
 AUTHOR(S): Bellal, M.; Boudrant, J.; Cheftel, C.
 CORPORATE SOURCE: Lab. Biochim. Technol. Aliment., Univ. Sci. Tech. Languedoc, Montpellier, Fr.
 SOURCE: Ann. Technol. Agric. (1978), 27(2), 469-88
 CODEN: ATAPAA; ISSN: 0003-4223
 DOCUMENT TYPE: Journal
 LANGUAGE: French
 AB The optimum conditions were detd. for the adsorption of a com. glucoamylase (EC 3.2.1.3) prepn. (from *Aspergillus niger*) on an anionic exchange resin (Amberlite IRA 93). The resin should be dry. The optimum adsorption pH was 5.2. A contact time of 5 h (at 4.degree.) was necessary to obtain max. adsorbed enzyme activity. The adsorbed enzyme activity increasd with the initial concn. of the enzyme soln. used, reaching a max. value (694 and 3050 IU/g resin for the glucoamylases Nova 150 L and rapidase resp.). The overall yield of adsorbed enzyme activity (adsorbed activity/initial activity used) decreased progressively as this max. was approached. The properties of adsorbed glucoamylase were also studied. The adsorbed enzyme remained highly active in the presence of maltose and maltodextrin solns. and dil. **starch** solns. The thermal stability of the enzyme was slightly enhanced by adsorption; almost no desorption or inactivation was induced by incubating the adsorbed enzyme in pH 4 NaOAc buffer at 40.degree. for 48 h. Incubation at pH 3, however, caused a loss of activity. The optimum pH values of the adsorbed and free

enzymes were 3 and 4.6, resp. At pH 4, the adsorbed enzyme retained .apprx.50% of its activity at pH 3. A **tubular** reactor charged with adsorbed glucoamylase was used for the **continuous hydrolysis** of solns. contg. maltose (12% wt./vol.), maltodextrins (25% wt./vol.), and **starch** (1% wt./vol.). The extent of **hydrolysis** of glycosidic bonds reached 70-100% for a residence time of 100 min in the reactor. The microbiol. stability of the reactor could be maintained for an extended length of time if substrate solns. were previously pasteurized. Under these conditions, **continuous hydrolysis** of maltodextrin solns. (DE 4-5) at 25% wt./vol., in pH 4, 0.01 M NaOAc buffer, was carried out for 30 days at 40.degree. with a residence time of 50 min. The extent of **hydrolysis** remained const. and was equal to 70%.

L12 ANSWER 10 OF 10 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1974:105394 CAPLUS

DOCUMENT NUMBER: 80:105394

TITLE: Study of performance of a **tubular** membrane reactor for an enzyme catalyzed reaction

AUTHOR(S): Closset, G. P.; Cobb, J. T.; Shah, Y. T.

CORPORATE SOURCE: Dep. Chem. Pet. Eng., Univ. Pittsburgh, Pittsburgh, Pa., USA

SOURCE: Biotechnol. Bioeng. (1974), 16(3), 345-60

CODEN: BIBIAU

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A **tubular** membrane reactor offers many advantages over a solid wall reactor to carry out an enzyme-catalyzed reaction. With proper membrane selectivity, the product may be sepd. from the reacting stream and the enzyme recycled for **continuous** reuse. In most cases, enzyme reuse contributes to the economic feasibility of a **continuous** enzyme-catalyzed process. Furthermore, the efficiency and performance of a membrane is greater than that of a solid wall reactor. **Continuous hydrolysis** of **starch** by the enzyme, .beta.-amylase, carried out in a com. available **tubular** membrane unit, was studied at different **starch** and enzyme concns. for a given system pressure and inlet flow rate. Results show that the performance of the membrane reactor is in all cases greater than that of the solid wall reactor. A steady state in performance or permeation rate is, however, not reached by the membrane reactor, which shows a **continuous** decline within the periods examd. This decline is caused in part by the aging of the **starch** soln. but mostly by the formation of a concd., or gel, layer at the membrane surface. This appears to be the main limiting factor for this process since the decline in reaction and permeation rate results in a severe decrease in the amt. of maltose in the permeate.

L18 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2000 ACS
ACCESSION NUMBER: 1979:594926 CAPLUS
DOCUMENT NUMBER: 91:194926
TITLE: Starch hydrolyzates
PATENT ASSIGNEE(S): Cellcor Corp. of Canada Ltd., Can.
SOURCE: Neth. Appl., 16 pp.
CODEN: NAXXAN
DOCUMENT TYPE: Patent
LANGUAGE: Dutch
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	----	-----	-----	-----
	NL 7713838	A	19790618	NL 1977-13838	19771214
AB	<p>Starch [9005-25-8] hydrolyzates are manufd. by continuously feeding an aq. starch suspension to a tubular heating zone at a pressure above that of satd. steam to heat the starch to >100.degree.. This liq., which is at least partially gelled, is fed to a compression zone at a 1st elevated pressure and then to a tubular reaction zone at a 2nd elevated pressure which is considerably lower than the 1st pressure. A very reactive starch liq. in the form of a fine sprayer mist emerges from the compression zone into the reaction zone with a rapid release of energy, and is continuously fed through the tubular reaction zone to form a homogeneous hydrolyzate.</p>				

L28 ANSWER 1 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1999:116661 CAPLUS

DOCUMENT NUMBER: 130:169771

TITLE: Method and **apparatus** for **continuous** preparation of **hydrolyzed**, optionally substituted **starches** and their use*applicant's PCT*

INVENTOR(S): Sommermeyer, Klaus; Henning, Klaus; Goerg, Michael; Maul, Thomas

PATENT ASSIGNEE(S): Fresenius A.-G., Germany

SOURCE: Ger., 6 pp.

CODEN: GWXXAW

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19744353	C1	19990211	DE 1997-19744353	19971008
WO 9907743	A1	19990218	WO 1998-EP5011	19980807
W: BR, CA, CN, MX, NO, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1001993	A1	20000524	EP 1998-946298	19980807
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
NO 2000000636	A	20000208	NO 2000-636	20000208
PRIORITY APPLN. INFO.:				
			DE 1997-19734370	19970808
			DE 1997-19744353	19971008
			WO 1998-EP5011	19980807

AB In the title process, which is economical and gives products with controlled properties, useful in medicine and in foods (no data), an aq. suspension of starch is fed continuously by gravity, essentially without mixing, to the hydrolysis stage and hydrolysis is interrupted at the desired degree by neutralization. A block diagram of the process and app. is included.

L28 ANSWER 2 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1998:612450 CAPLUS

DOCUMENT NUMBER: 129:202107

TITLE: Membrane technology in corn refining and bioproduct processing

AUTHOR(S): Singh, Navpreet; Cheryan, Munir

CORPORATE SOURCE: Agricultural Bioprocess Laboratory, University Illinois Urbana-Champaign, Urbana, IL, 61801, USA

SOURCE: Starch/Staerke (1998), 50(1), 16-23

CODEN: STARD; ISSN: 0038-9056

PUBLISHER: Wiley-VCH Verlag GmbH

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB A review with 50 refs. Membrane technol. is penetrating the corn refining

industry in a variety of applications. The largest single use to date is probably clarification of corn **starch hydrolyzates** where it can substantially reduce operating and waste disposal costs.

Bioproducts produced from dextrose by fermn. and/or enzymic reactions are being concd., fractionated, or purified to varying extents by several membrane technologies. These bioconversion reaction steps could also benefit by coupling the appropriate membrane to the reaction vessel or fermenter as a **continuous** membrane reactor. This was shown to improve enzyme utilization and reduce reaction time in saccharification and improve fermn. productivity and reduce downstream costs in fermn.

L28 ANSWER 3 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1998:463438 CAPLUS
DOCUMENT NUMBER: 129:135255
TITLE: Enzymic conversion of corn starch in twin-screw extruder
AUTHOR(S): Curic, D.; Karlovic, D.; Tripalo, B.; Jezek, D.
CORPORATE SOURCE: Faculty of Food Technology and Biotechnology, University of Zagreb, Zagreb, Croatia
SOURCE: Chem. Biochem. Eng. Q. (1998), 12(2), 63-71
CODEN: CBEQEZ; ISSN: 0352-9568
PUBLISHER: Croatian Society of Chemical Engineers
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Investigation of thermomech. gelatinization and the enzymic liquefaction processes of **starch** in the twin screw extruder showed the possibility of using an extruder as an integral part of the **continuous** process of **starch hydrolysis**. The influence of barrel temp. of the last section of extruder (106-154.degree.C), moisture fraction in the extruder (33-57%), screw rotation rate (170-230 min⁻¹) and concn. of .alpha.-amylase Termamyl 120L added in extruder (10-30 mL kg⁻¹ d.m. **starch**) on the degree of **starch hydrolysis** in the extruder, on the residual enzymic activity present in freeze-dried extrudates, on the soly. of extrudates in cold water and on the temp. of the extrudates at the outlet of the extruder were investigated. The expts. were carried out in accordance with the Compositional Orthogonal Plan of expt., 23. Optimization of the process of native corn **starch** hydrolisis in an extruder showed that maltodextrins of dextrose equiv., DE .simeq.10 and high soly. in cold water, 70-85%, could be produced in the following conditions: moisture fraction in the extruder 55%, barrel temp. of the last section of extruder 110.degree.C, screw rotation rate 175 min⁻¹, concn. of .alpha.-amylase (Termamyl 120L) in the extruder 20 mL kg⁻¹ d.m. **starch** and corn **starch** feed flow rate 20 kg h⁻¹.

L28 ANSWER 4 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1996:763666 CAPLUS
DOCUMENT NUMBER: 126:46330
TITLE: The stage approach in scaling-up immobilized-cell reactors. The example of the rotating biological contactor
AUTHOR(S): Converti, A.
CORPORATE SOURCE: Istituto Ingegneria Chimica Processo "G.B. Bonino", Univ. Genoa, Genoa, I-16145, Italy
SOURCE: Chem. Biochem. Eng. Q. (1996), 10(4), 175-181
CODEN: CBEQEZ; ISSN: 0352-9568
PUBLISHER: Hrvatsko Drustvo Kemijskih Inzenjera i Tehnologa
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The scale-up effects on the performance of an immobilized-cell rotating disk contactor used for alc. fermn. are investigated. Using both design and exptl. data concerning a lab.-scaled reactor, the suitability of a stage approach for scaling-up plants with increasing size is proved in this case. To this purpose, an intermediate pilot plant with 0.5 m3 working vol. has been built-up and subsequently tested for **continuous** fermn. of dil. **starch hydrolyzate** solns. The specific redn. of performance ascribed to scale-up is handled by the introduction and the calcn. of a correction factor. The stage approach also allows a cost anal. of hypothetical industrial realizations.

L28 ANSWER 5 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1992:192574 CAPLUS
DOCUMENT NUMBER: 116:192574
TITLE: Ethanol production with immobilized *Zymomonas mobilis* in the fluidized-bed reactor
AUTHOR(S): Weuster-Botz, Dirk
CORPORATE SOURCE: Forschungszent. Juelich G.m.b.H., Juelich, D-5170, Germany
SOURCE: Forschungszent. Juelich: Ber. (1991), Juel 2518, 155 pp.
CODEN: FJBEE5; ISSN: 0366-0885
DOCUMENT TYPE: Report
LANGUAGE: German

AB The prodn. of EtOH from **starch hydrolyzate** by **continuous** fermn. with *Z. mobilis* in a fluidized-bed fermentor is extensively described.

L28 ANSWER 6 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1991:245901 CAPLUS
DOCUMENT NUMBER: 114:245901
TITLE: Multistage ethanol fermentation of wastes in fluidized bed reactors. Operation in laboratory- and bench scales
AUTHOR(S): Weuster, D.; Aivasidis, A.; Wandrey, C.
CORPORATE SOURCE: Inst. Biotechnol. 2, Forschungszent. Juelich G.m.b.H., Juelich, D-5170, Fed. Rep. Ger.
SOURCE: DECHEMA Biotechnol. Conf. (1990), 4(Pt. B, Lect. DECHEMA Annu. Meet. Biotechnol. 8th, 1990), 721-4
CODEN: DBCOEU
DOCUMENT TYPE: Journal
LANGUAGE: English

AB A **continuous** process of EtOH fermn. of sugar contg. wastes without pretreatment is developed. By using sintered glass beads in total mixed fluidized bed reactions for the natural immobilization of *Zygomonas mobilis*, high yields (>50 g/L-h) at low residence times (<1 h) are possible. Cascading of fluidized-bed reactors results in higher volumetric yields than a single fluidized-bed reactor at conversion rates of 99%. Multistage EtOH fermns. of **hydrolyzed** waste **starch** with 2 55-L fluidized-bed reactors were stable even under nonsterile conditions.

L28 ANSWER 7 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1990:476560 CAPLUS
 DOCUMENT NUMBER: 113:76560
 TITLE: Ethanol fermentation of sugar-containing wastes with *Zymomonas mobilis* in a fluidized-bed reactor
 AUTHOR(S): Weuster, D.; Aivasidis, A.; Wandrey, C.
 CORPORATE SOURCE: Inst. Biotechnol., KFA-Juelich G.m.b.H., Juelich, D-5170, Fed. Rep. Ger.
 SOURCE: DECHEMA Biotechnol. Conf. (1989), 3(Pt. A, Jt. Meet. SIM DECHEMA, Presentation Biochem. Lab., Microb. Princ. Bioprocesses, Appl. Genet.), 507-10
 CODEN: DBCOEU
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB A process for the **continuous** fermn. of sugar-contg. wastes without pretreatment is developed. By using sintered glass beads in a fluidized bed reactor for the natural immobilization of *Zymomonas mobilis*, yields of >50 g/L-h at residence times <1 h are possible. In lab. scale fluidized-bed reactors, long term fermns. of **hydrolyzed** waste **starch** under nonsterile conditions are stable, although the substrate is contaminated with lactic acid bacteria.

L28 ANSWER 8 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1989:441725 CAPLUS
 DOCUMENT NUMBER: 111:41725
 TITLE: Method and **apparatus** for disintegration and degradation of starch and other carbohydrates in high concentrations
 INVENTOR(S): John, Karl
 PATENT ASSIGNEE(S): Gesellschaft fuer Verfahrens- und Verklebungstechnik m.b.H. (GFV2), Fed. Rep. Ger.
 SOURCE: Ger. Offen., 6 pp.
 CODEN: GWXXBX
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 3731293	A1	19890406	DE 1987-3731293	19870917

AB In the title process, which can be operated continuously and economically on a large scale, the powd., dry carbohydrates are fed to a converter in H₂O with stirring and heated with steam and degrdn. agents. A mixt. of wheat flour, 0.3% com. .alpha.-amylase, H₂O, and steam stirred at 1400 rpm and 7.5 kW was fed continuously to a converter heated with steam at 95.degree. and then pumped at .apprx.200 L/h to a deactivation zone heated to 120.degree. to give a 70% slurry which was dried to 10% moisture to give maltodextrin suitable for food or animal feed. A schematic diagram of the app. is shown.

L28 ANSWER 9 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1989:435766 CAPLUS
 DOCUMENT NUMBER: 111:35766
 TITLE: **Continuous hydrolysis of**

starch in membrane unit connected immobilized enzyme reactor

AUTHOR(S): Uttapap, Dudsadee; Koba, Yojiro; Ishizaki, Ayaaki
 CORPORATE SOURCE: Fac. Agric., Kyushu Univ., Fukuoka, 812, Japan
 SOURCE: J. Fac. Agric., Kyushu Univ. (1989), 33(3-4), 167-75
 CODEN: JFAKAU; ISSN: 0023-6152

DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The use of a tangential flow filtration unit (TFFU) for the sepn. of immobilized glucoamylase particles in the **hydrolysis** of sol. **starch** by a **continuous** mode was studied. Both the filtration rate and reducing sugars, produced as the result of enzymic **hydrolysis**, decreased with the filtration time. The filtration rate at various **starch** concn. within 40 h appeared to fit best into an exponential equation with a const. filtration rate at infinite time and the steady state may finally be reached at a certain value.

When the system was operated for 8 days, the apparent filtration rate of the 1st 2 days fit well with the exponential equation, but after that it did not follow the assumption. The temp. was found to influence the filtration rate. The increase in filtration rate alone with increasing temp. was probably due to decreasing retrogradation of sol. **starch** at high temp. A preliminary study of prefiltration found that the slurry which passed the prefilter gave a higher filtration rate in TFFU compared to nonprefiltered slurry.

L28 ANSWER 10 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1987:405678 CAPLUS
 DOCUMENT NUMBER: 107:5678
 TITLE: **Continuous** alcohol production from **starch hydrolyzate**

AUTHOR(S): Parisi, F.; Converti, A.; Del Borghi, M.; Perego, P.; Zilli, M.; Ferraiolo, G.
 CORPORATE SOURCE: Inst. Chem. Eng. Sci. Technol., Univ. Genoa, Genoa, 16145, Italy
 SOURCE: Biotechnol. Bioeng. Symp. (1986), 17(Symp. Biotechnol.

Fuels Chem., 8th, 1986), 379-89
 CODEN: BIBSBR; ISSN: 0572-6565

DOCUMENT TYPE: Journal
 LANGUAGE: English

AB A rotating biol. surface device provided with cell support was used for the conversion of **starch hydrolyzate** to EtOH. A general kinetic model, derived from **continuous** data of a single unit utilizing different substrates, allowed the prediction of the conversion yield of a 2-stage system.

L28 ANSWER 11 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1984:573389 CAPLUS
 DOCUMENT NUMBER: 101:173389
 TITLE: Continuous process and **apparatus** for modifying carbohydrate material

INVENTOR(S): Assarsson, Per G.; Nagasuye, Joseph H.
 PATENT ASSIGNEE(S): St. Lawrence Technologies Ltd., Can.
 SOURCE: U.S., 17 pp. Cont.-in-part of U.S. Ser. No. 167,543.
 CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 3
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 4469524	A	19840904	US 1982-402030	19820726
PRIORITY APPLN. INFO.:			US 1979-70438	19790828
			US 1980-167543	19800710

AB A reactor, consisting of tubes passing through a heat exchanger, is described and is used for continuous modification of starch (I) [9005-25-8] with HCl in an aq. slurry. Thus, a 36.4% I slurry contg. 200 mL HCl per 100 lb I solids was passed through the reactor for 140 s residence time at 166.degree. and 900 psi pressure to give syrup with dextrose equiv. .apprx.73.

L28 ANSWER 12 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1982:618387 CAPLUS

DOCUMENT NUMBER: 97:218387

TITLE: **Apparatus** and methods for continuous separation by selective adsorption of a mixture of sugars and/or polyols

INVENTOR(S): Devos, Francis; Delobbeau, Didier; Caboche, Jean Jacques; Lemay, Patrick; Huchette, Michel

PATENT ASSIGNEE(S): Roquette Freres S. A., Fr.

SOURCE: Fr. Demande, 25 pp.

CODEN: FRXXBL

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2454830	A1	19801121	FR 1979-10563	19790425
FR 2454830	B1	19831014		
US 4422881	A	19831227	US 1980-201832	19801029
PRIORITY APPLN. INFO.:			FR 1979-10563	19790425

AB A train of adsorption columns for the sepn. of sugars and/or polyols has flap valves to automatically prevent the backflow during the desorption phase, which permits **continuous** operation. Thus, a **hydrolyzed starch** (I) [9005-25-8] soln. (500 g/L) contg. fructose (II) 42, glucose (III) 52, and polysaccharides 6% is sepd.

in a column train contg. a sulfonated styrene-divinylbenzene copolymer in the Ca form by feeding I soln. at 20 L/h and H2O 44 L/h to the column train for 15 min, to produce a II-enriched soln. contg. 160 g solids/L at 39.4 L/h and a III-enriched soln. contg. 150 g solids/L at 24.6 L/h.

L28 ANSWER 13 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1982:506586 CAPLUS

DOCUMENT NUMBER: 97:106586

TITLE: **Apparatus** and methods for separation of .alpha.-hydroxy and .alpha.-amino carboxylic acids from sugar mediums containing them

INVENTOR(S): Devos, Francis; Delobbeau, Didier; Huchette, Michel

PATENT ASSIGNEE(S): Roquette-Freres S. A., Fr.

09/485,377

SOURCE: Fr. Demande, 26 pp.
CODEN: FRXXBL
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2455022	A1	19801121	FR 1979-10564	19790425
FR 2455022	B1	19840518		

AB An app. and method are described for the **continuous** sepn. of .alpha.-hydroxy and .alpha.-amino carboxylic acids from sugar mediums by selective adsorption on columns connected in series and contg. cation-exchange resins (Ca²⁺ form). Means for supplying the columns with sample and solvent, for connecting the columns, and for withdrawing the fractions enriched in 1 of the constituents of the mixt. are also described. The app. also includes means for regulating the temp. of the sample mixt. and of the solvent, 2 volumetric pumps for supplying the columns, a volumetric pump for withdrawal of the enriched fractions, check values between the columns, and recycling containers for continuously supplying the columns. The app. was used for the purifn. of Ca lactate (I) from the sugar and protein contaminants obtained by fermn. of a **starch hydrolyzate** by using 4 columns. I was adsorbed on the 1st column, whereas the other 3 columns were enriched in the impurities. The app. was also used for the purifn. of Ca gluconate, Ca xylonate, and for the sepn. of glutamic acid from glucose.

L28 ANSWER 14 OF 18 CAPLUS COPYRIGHT 2000 ACS
ACCESSION NUMBER: 1980:606472 CAPLUS
DOCUMENT NUMBER: 93:206472
TITLE: Continuous production of starch hydrolysates
INVENTOR(S): Hughes, John F.
PATENT ASSIGNEE(S): Kirby, Shapiro, Eades and Cohen, Can.
SOURCE: U.S., 9 pp. Cont.-in-part of U.S. 4,137,094.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 4221609	A	19800909	US 1978-959497	19781215
US 4137094	A	19790130	US 1978-868921	19780112

PRIORITY APPLN. INFO.:
US 1976-667170 19760315
US 1977-767794 19770211
US 1978-868921 19780112

AB The hydrolysis of starch (I) [9005-25-8] in the presence of HCl soln. at high pressure gave syrup having a wide range of dextrose equiv. (DE) values. Thus, a mixt. of 100 lb corn I, 105 lb H₂O, and 200 mL 37% HCl was continuously pumped through the described reactor at inlet pressure of 500 psi and bath temp. of 225.degree. with a flow rate of .apprx. 1.3 gal/min to give glucose syrup with DE value 72.2 and reducing sugar 50.4%.

L28 ANSWER 15 OF 18 CAPLUS COPYRIGHT 2000 ACS
 ACCESSION NUMBER: 1978:122901 CAPLUS
 DOCUMENT NUMBER: 88:122901
 TITLE: Method and **apparatus** for hydrolysis of a
 starch dispersion in an aqueous medium
 INVENTOR(S): Thivend, Pierre; Mercier-Greenwood, Christiane;
 Guilbot, Andre
 PATENT ASSIGNEE(S): Institut National de la Recherche Agronomique, Fr.
 SOURCE: Ger. Offen., 60 pp.
 CODEN: GWXXBX
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 2730806	A1	19780126	DE 1977-2730806	19770707
FR 2357645	A1	19780203	FR 1976-21361	19760707
FR 2357645	B1	19800229		
US 4188466	A	19800212	US 1977-813275	19770706
GB 1582855	A	19810114	GB 1977-28635	19770707
			FR 1976-21361	19760707

PRIORITY APPLN. INFO.:
 AB Treating an aq. starch (I) [9005-25-8] slurry by ultrasound for 4-6 min at 94.degree. gave a product with .apprx.99% dispersed I. Glucose syrups were produced from the above dispersion by continuously hydrolyzing with glucoamylase (II) [9032-08-0] and sepg. the formed hydrolyzate by dialysis. An automatic dosing system for I dispersion and II was also described.

L28 ANSWER 16 OF 18 CAPLUS COPYRIGHT 2000 ACS
 ACCESSION NUMBER: 1974:465502 CAPLUS
 DOCUMENT NUMBER: 81:65502
 TITLE: **Apparatus** for producing sizing by the
 hydrolysis of starch
 AUTHOR(S): Zarudnev, Yu. N.
 CORPORATE SOURCE: Sev.-Kavk. Fil., Vses. Nauchno-Issled. Inst.
 Krakhmala, USSR
 SOURCE: Sakh. Prom. (1974), (1), 50-1
 CODEN: SAPRAK
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian
 AB A concd. **starch** (I) [9005-25-8] suspension is passed at .sim.0.5 m/sec rate in the annular between 2 perforated coaxial cylinders. Steam ejected through the perforations agitates the suspension partly **hydrolyzing** I. The app. is used for the **continuous** manuf. of I sizing.

L28 ANSWER 17 OF 18 CAPLUS COPYRIGHT 2000 ACS
 ACCESSION NUMBER: 1970:500257 CAPLUS
 DOCUMENT NUMBER: 73:100257
 TITLE: Carbohydrate composition of **hydrolyzates**
 obtained from **apparatus** for the
continuous hydrolysis of
starch
 AUTHOR(S): Sidorova, E. K.

CORPORATE SOURCE: USSR
 SOURCE: Sakh. Prom. (1970), 44(8), 56-60
 CODEN: SAPRAK

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB The contents of dry substance, reducing substances, glucose, maltose, and dextrins, and also the sp. rotation and d.p., were detd. for **hydrolyzates** obtained by the **hydrolysis of starch** in a batch converter and in an NOK-100 **continuous** converter. The **continuous hydrolyzer** gave a syrup of standard quality, with carbohydrate compn. similar to that given by the batch converter. At a content of reducing substances of 36.6-52.3%, the syrup from the **continuous hydrolyzer** contained 18.2-29.0% glucose, 18-32.7% maltose, and 52.3-64.1% dextrins, which corresponded to the compn. of the majority of syrups with the same content of reducing substances, obtained from the batch converter.

L28 ANSWER 18 OF 18 CAPLUS COPYRIGHT 2000 ACS

ACCESSION NUMBER: 1970:123250 CAPLUS

DOCUMENT NUMBER: 72:123250

TITLE: Granulated D-glucose

INVENTOR(S): Kroeyer, Karl K. K.; Thomsen, Lars O.

SOURCE: Ger. Offen., 20 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 1929006	A	19700205	DE 1969-1929006	19690607
GB 1267363	A	19720315	GB 1968-27489	19680610
BE 734280	A	19691117	BE 1969-734280	19690609
SE 360678	B	19731001	SE 1969-8161	19690609
NO 129355	B	19740401	NO 1969-2367	19690609
NL 6908804	A	19691212	NL 1969-8804	19690610
FR 2011917	A5	19700313	FR 1969-19102	19690610
PRIORITY APPLN. INFO.:			GB 1968-27489	19680610
			GB 1969-24289	19690513
			GB 1968-24289	19690513

AB D-Glucose in the form of a free-flowing granulate (grain size 0.5-2 mm) was prepd. from a **starch hydrolyzate** in a **continuous** process by crystn. in a specially designed app. consisting of a vessel with a heating jacket, a device for introducing

hot

air, and a vertical stirrer with the blades provided in their lower part with apertures through which D-glucose soln. could be introduced into the vessel. Thus, a **starch hydrolyzate** (87-91.degree. Brix), previously deionized, treated with charcoal, and heated to 90-110.degree., was introduced continuously into the crystn. app. filled with granulated D-glucose kept at 70-80.degree., the amt. of D-glucose in the soln. added being equal to the amt. of granulate removed from the top of the vessel. During the process, hot air was blown through the vessel to maintain the amt. of H₂O in the granulate <2%. An app. yielding 12 kg of granulated dextrose/hr is described.

DERWENT-ACC-NO: 1994-341891
DERWENT-WEEK: 199742
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TITLE: Hydrolysis of material containing cellulose and/or starch
- in tubular
reactor with limited zones with intensive mixing into which
chemicals are
introduced to start and stop hydrolysis.

INVENTOR: NILSSON, K

PATENT-ASSIGNEE: REGALCO AB[REGAN]

PRIORITY-DATA: 1993SE-0001263 (April 16, 1993)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	
PAGES	MAIN-IPC		
EP 795034 A1	September 17, 1997	E	000
C13K 001/02			
WO 9424316 A1	October 27, 1994	E	018
C13K 001/02			
SE 501141 B	November 21, 1994	N/A	000
C13K 001/02			
SE 9301263 A	October 17, 1994	N/A	000
C13K 001/02			
AU 9465474 A	November 8, 1994	N/A	000
C13K 001/02			
FI 9504878 A	November 15, 1995	N/A	000
C13K 000/00			

DESIGNATED-STATES: DE DK FR GB AU BB BG BR BY CA CN CZ FI HU JP
KP KR KZ LK LV M
G MN MW NO NZ PL RO RU SD SK UA US UZ VN AT BE CH DE DK ES FR GB
GR IE IT LU MC
NL OA PT SE

CITED-DOCUMENTS: EP 37912; US 4400218 ; US 5114488

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO
APPL-DATE		
EP 795034A1	N/A	1994EP-0913239
April 15, 1994		
EP 795034A1	N/A	1994WO-SE00336
April 15, 1994		
EP 795034A1	Based on	WO 9424316

	Type	L #	Hits	Search Text	DBs	Time Stamp
1	IS&R	L1	2922	((("127/1") or ("127/6-9") or ("127/32-37") or ("127/65") or ("127/69-71") or ("536/124"))).CCLS.	USPAT	2000/09/2 6 11:05
2	BRS	L2	92164	starch	USPAT	2000/09/2 6 11:05
3	BRS	L3	98059	hydrolysis	USPAT	2000/09/2 6 11:06
4	BRS	L4	70447	hydrolyz\$3	USPAT	2000/09/2 6 11:06
5	BRS	L5	21427 3	degrad\$5	USPAT	2000/09/2 6 11:06
6	BRS	L6	4533	depolymeriz\$5	USPAT	2000/09/2 6 11:07
7	BRS	L7	12816 2	3 or 4	USPAT	2000/09/2 6 11:07
8	BRS	L8	31611 8	5 or 6 or 7	USPAT	2000/09/2 6 11:07
9	BRS	L9	9854	2 same 8	USPAT	2000/09/2 6 11:07
10	BRS	L10	61101 0	continuous	USPAT	2000/09/2 6 11:08
11	BRS	L11	3544	9 and 10	USPAT	2000/09/2 6 11:08
12	BRS	L12	164	1 and 11	USPAT	2000/09/2 6 11:08

	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	50679	starch	EPO; JPO; Derwent	2000/09/2 6 10:17
2	BRS	L2	56732	hydrolysis	EPO; JPO; Derwent	2000/09/2 6 10:18
3	BRS	L3	22582	hydrolyz\$3	EPO; JPO; Derwent	2000/09/2 6 10:18
4	BRS	L4	1184	depolymeriz\$5	EPO; JPO; Derwent	2000/09/2 6 10:18
5	BRS	L5	86884	degrad\$5	EPO; JPO; Derwent	2000/09/2 6 10:18
6	BRS	L6	16216 7	2 or 3 or 4 or 5	EPO; JPO; Derwent	2000/09/2 6 10:18
7	BRS	L7	4156	1 and 6	EPO; JPO; Derwent	2000/09/2 6 10:18
8	BRS	L8	45025 5	continuous	EPO; JPO; Derwent	2000/09/2 6 10:19
9	BRS	L9	3443	1 same 6	EPO; JPO; Derwent	2000/09/2 6 10:19
10	BRS	L10	107	8 and 9	EPO; JPO; Derwent	2000/09/2 6 10:19